

CMP Polishing Head Retaining Ring Groove Design for Microscratch Reduction**Abstract**

A chemical-mechanical polish (CMP) machine and fabrication process using the same. The CMP machine has a CMP retaining ring comprising: an inner peripheral surface; an outer peripheral surface; a lower surface adapted to contact and depress an upper surface of a polishing pad during chemical mechanical polishing of a lower surface of a substrate. The substrate is contained within the inner peripheral surface of the retaining ring during chemical mechanical polishing. At least a groove on the lower surface of the retaining ring. At least a portion of the groove has a rounded contour. In an aspect, the groove has a semicircle profile. In another aspect, the groove has a semicircle profile and a curved top corner profile at adjacent to the lower surface of the retaining ring. The retaining ring with a curved portion of groove reduces the accumulation of dried slurry in the groove and thus reduces micro-scratches.